

## Public Utility District No. 1 of Snohomish County

### *Smart Grid Infrastructure Modernization of Electrical Distribution System*

#### Abstract

The Public Utility District No. 1 of Snohomish County Washington (Snohomish PUD) project involves several types of smart grid systems to enhance distribution system performance and reliability. The project includes a digital communication network covering Snohomish PUD's entire distribution system to better respond to changes in electricity demand and grid conditions. The project upgrades 42 of 85 substations with automated control capabilities to prepare the substations for full-scale deployment of distribution automation and integration of distributed energy resources. The project is deploying advanced automation equipment to 10 circuits to reduce line losses and to improve service reliability. These assets are being managed through a distribution management system, which allows Snohomish PUD to better monitor and control grid operations and conditions. These upgrades allow Snohomish PUD to reduce operations and maintenance costs and improve distribution system efficiency, reliability, and power quality.

#### Smart Grid Features

**Communications infrastructure** includes a fiber optics network that connects all of Snohomish PUD substations and serves as the backbone communications link between the substations, Snohomish PUD offices, and its energy control center. This network combines corporate, operational, and non-operational data in a secure manner, and makes that data available at any location that requires it to support the applications and devices specific to the business function. The project uses a dedicated field area network wireless telecommunications for distribution automation equipment and the distribution management system. These systems support future deployment and integration of new applications such as an advanced metering infrastructure (AMI) and an outage management system. The new distribution management system enables more precise modeling of distributed generation resources such as solar and energy storage, thus easing their integration with the grid.

**Distribution automation systems** include advanced automated equipment to improve reliability and to reduce line losses of the distribution system. Snohomish PUD is deploying automated switches and reclosers, automated regulators and capacitor banks, and fault indicators on 10 high-priority circuits. These upgrades provide more rapid and effective responses to grid disturbances, reduce the frequency and duration of outages, and reduce operations and maintenance costs. By enhancing the regulation of voltage and current on the grid with automated equipment, Snohomish PUD expects to improve the stability and power factor of delivered electricity and reduce distribution line losses.

#### At-A-Glance

**Recipient:** Public Utility District No. 1 of Snohomish County

**State:** Washington

**NERC Region:** Western Electricity Coordinating Council

**Total Budget:** \$31,651,634

**Federal Share:** \$15,825,817

**Project Type:** Electric Distribution Systems

#### Equipment

- **Distribution Automation Equipment for 10 out of 340 Distribution Circuits**
  - Distribution Management System
  - Distribution Automation Communications Network
  - Automated Distribution Circuit Switches
  - Automated Capacitors
  - Automated Regulators
  - Circuit Monitors/Indicators

#### Targeted Benefits

- **Reduced Operating and Maintenance Costs**
- **Increased Electric Service Reliability and Power Quality**
- **Reduced Costs from Equipment Failures and Distribution Line Losses**
- **Reduced Greenhouse Gas Emissions**

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**Distribution system energy efficiency improvements** involve the integration of automated capacitor banks and regulators with a power quality monitoring system. These devices improve voltage and VAR control, power quality, and increase distribution capacity by reducing energy losses on the distribution system. Furthermore, the integration of distribution management system involves integration with the other distribution automation assets to enable Snohomish PUD to manage power distribution to better match customer demand.

**Timeline**

Key Milestones	Target Dates
Fiber optics communication infrastructure/substation automation start	Q3 2009
Fiber optics communication infrastructure completed	Q4 2010
Distribution automation equipment deployment completed	Q2 2012
Distribution management system implementation completed	Q4 2012
Substation automation expansion completed	Q2 2013

**Contact Information**

Will Odell  
Smart Grid Program Manager  
Snohomish County Public Utility District  
whodell@snopud.com

Recipient Team Web Site: [www.snopud.com](http://www.snopud.com)